

Original Research Article

Quality of life among diabetic patients in Ahmedabad, India

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ABSTRACT

Background: Diabetes, affecting 422 million people worldwide, with India having the second-largest diabetic population. India accounts for 1 in 7 of the global diabetic population and 63% of all deaths from NCDs. In Gujarat, diabetes prevalence is 16% in women and 17% in men. Quality of life (QOL) includes physiological, psychological, social, and spiritual satisfaction, is a key factor in disease management. Assessing QOL helps identify patient needs, evaluate treatment regimens, and improve health management.

Methods: We conducted a community based cross-sectional study among diabetic patients using a Short Form 36 V2 to measure QOL of diabetics aged >18 years. In-person interviews were conducted with 310 diabetic patients from 30 UHCs of Ahmedabad Municipal Corporation that were chosen by cluster sampling. Data was analysed using suitable statistical parameters.

Results: The study included 160 male and 150 female diabetic patients, with a mean age of 55.46±9.85 years and mean diabetes duration of 5.69±3.44 years. The mean QOL score was 71.37±18.14, with males reporting higher QOL than females. Advanced age, longer diabetes duration, sedentary lifestyle, comorbidities, and complications were associated with lower QOL. Higher education, nuclear family type, higher socio-economic status (SES) and regular physical activity improved QOL. No significant association was found between QOL and religion, occupation, marital status, diet type, overcrowding, or addiction.

Conclusions: Significantly associated variables with QOL included Age, gender, education, type of family, Socioeconomic status, lifestyle, physical activity, comorbidity, duration and complication of diabetes.

Keywords: Diabetes, Quality of life, Non-communicable disease

INTRODUCTION

Non-communicable diseases (NCDs) like cardiovascular diseases (CVDs), cancer, diabetes, and chronic respiratory diseases are leading causes of global mortality, responsible for 71% of all deaths.^{1,2} Diabetes, affecting 422 million people worldwide, is rapidly becoming an epidemic, with India having the second-largest diabetic population.³ India accounts for 1 in 7 of the global diabetic population and 63% of all deaths from NCDs.^{4,5} In Gujarat, diabetes prevalence is 16% in women and 17% in men.⁶ Diabetes often coexists with

obesity, hypertension, and abnormal blood lipids, increasing cardiovascular risks. Diabetic retinopathy affects one-third of those with diabetes.⁷

According to WHO, Quality of life is defined as “individual’s perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns”.⁸ QOL includes physiological, psychological, social, and spiritual satisfaction, is a key factor in chronic disease management. Psychosocial aspects significantly influence self-care, adherence to

treatment, and overall health outcomes. Assessing QOL helps identify patient needs, evaluate treatment regimens, and improve health management.⁹

This study aimed to assess the demographic profile and QOL, identifying factors that affect QOL in diabetic patients.

METHODS

The study employed an observational cross-sectional design conducted in Ahmedabad Municipal Corporation (AMC), which is divided into 7 zones and contains 79 Urban Health Centres (UHCs). The study was carried out between November 2021 and January 2023, with a target population of diabetic patients aged over 20 years. Using the formula $N = 4pq/l^2$, the sample size was determined to be 305 participants; nevertheless, 330 individuals were chosen to guarantee robustness.

AMC is divided into 7 zones with 79 UHCs, serving a total population of 6,997,885.¹⁰ A sample interval of 233,263 was calculated by dividing the population by 30. A random number (200,000) was selected, and 30 UHCs were chosen through cluster sampling. From each UHC, 11 diabetic patients attending the OPD on the day of the visit were selected, with additional visits made to ensure a complete sample of 11 patients per UHC if needed. During data cleaning, 20 participants were removed from the study because of insufficient data. Thus, 310 participants were included in the study.

The inclusion criteria required patients to have been diagnosed with diabetes for more than a year, while patients with gestational diabetes were excluded.

Data were collected using pre-structured questionnaire, which included the WHO STEP-modified questionnaire for NCD surveillance and the SF-36v2 questionnaire for assessing quality of life (QOL) through private, face-to-face interviews conducted by the same researcher, with participants filling out the questionnaires themselves. For those unable to write, the researcher assisted by recording their responses verbatim.

Data were entered into MS Excel and analysed using SPSS version 20. Descriptive statistical analysis was performed, with means and standard deviations calculated for age and QOL scores. The chi-square test was used to study associations between variables, considering a p-value of <0.05 as statistically significant.

Ethical approval for the study was obtained from the Institutional Review Board (IRB) of Smt. NHL Municipal Medical College, and written informed consent was obtained from all participants, ensuring their anonymity and confirming no conflict of interest.

The study instrument comprised two components:

Socio-demographic information as follows: General information including age, gender, occupation, marital status, family type, socio-economic status, and overcrowding; behaviour habits including addiction, diet, lifestyle and physical exercise; medical history including family history, comorbidity, duration and complication of diabetes.¹¹

Occupation of the participants was classified in unemployed or retired, unskilled, semi-skilled, skilled, clerical/shop owner/farmer, semi-professional and professional according to Modified Kuppaswamy classification.¹²

Life style was classified in sedentary, moderate and heavy according to NIN-Hyderabad.¹³

Type of family was classified on the basis of extension of families in nuclear, joint and three generation family.¹²

Socio-economic status was classified in class I to V as per Modified BG Prasad's classification.¹²

Presence of overcrowding was considered as per recommended standards of floor space per person.¹⁴

Quality of life assessment - using the SF-36v2, which measures eight health domains¹⁵: Physical Functioning (PF), Role limitation Physical (RP), Role limitation Emotional (RE), Energy/Fatigue (EF), Emotional Wellbeing-Mental Health (MH), Social Functioning (SF), Bodily Pain (BP), General Health (GH).

These domains were scored from 0 to 100. The scoring manual of SF-36 v2 was used for calculating scores then QOL was classified as poor (<50 score), fair (50-75 score), or good (>75 score).

RESULTS

This study assessed the demographic profile and quality of life (QOL) among 310 diabetic patients in Ahmedabad Municipal Corporation. The findings were divided into two parts:

Part-1: socio-demographic profile, behaviour habits and medical history

Part-2: QOL assessment with its associations with various factors.

Part-1: socio-demographic profile, behaviour habits and medical history

Of the 310 participants, 160 were male and 150 were female, with the majority (73.9%) being Hindu. The mean age was 55.46±9.85 years, with minimum and maximum age being 32 and 81 years respectively and most participants were aged 51-60 years.

Education level was higher among males, with significant differences ($\chi^2=44.73$, $p<0.00001$). Among males, 9.4% were just literate, 22% completed higher secondary school and 7.5% were graduates. Among females, 18%

were just literate, 2% completed higher secondary school, and 1.3% were graduates. Of the 4 postgraduates, 3 were male and 1 was female (Table 1).

Table 1: Association of gender with various socio-demographic variables.

Demographic variable	Sub categories	Gender		Total (n=310)	χ^2 value	P value	Result
		Male (=160)	Female (N=150)				
Education*	Lower	17 (N 10.6)	41 (27.3)	58	44.73	<0.00001	Significant
	Medium	93 (58.1)	103 (68.7)	196			
	Higher	50 (31.3)	6 (4)	56			
Life style	Sedentary	45 (28.1)	126 (84)	171	98.14	<0.0001	Significant
	Moderate	104 (65)	23 (15.3)	127			
	Heavy	11 (6.9)	1 (0.7)	12			
Addiction	Yes	82 (51.3)	14 (9.3)	96	63.62	<0.0001	Significant
	No	78 (48.7)	136 (90.7)	214			
Physical exercise	Yes	56 (35)	59 (39.3)	115	0.62	0.42	Non Significant
	No	104 (65)	91 (60.7)	195			

*Numbers in bracket represented the percentage. Result significant at $p<0.05$

Regarding occupation, 45% were unemployed/retired, with 24.5% unskilled workers. Among 139 unemployed participants, majority (79%) were female. Socio-economic status (SES) showed that 50% were in SES class II, and 47% in SES class III and none of them were in class I and IV. Most participants (44%) lived in joint families, with 87% experiencing overcrowding.

According to lifestyle characteristics, 55% of people led sedentary lifestyles. The gender difference in lifestyle was statistically significant ($\chi^2=98.14$, $p<0.0001$), suggesting that women were more likely to lead sedentary lifestyles than men (Table 1). Of 310 participants, 62% were vegetarians and 38% had a mixed diet.

Addictive habits like tobacco chewing or sniffing, smoking (bidi or cigarette), alcohol drinking or sniffing drugs were reported by 31% of participants, primarily among males ($\chi^2=63.62$, $p<0.0001$). Only 37.1% of participants reported exercising, and there were no significant gender differences ($\chi^2=0.62$, $p=0.42$), majority of them walk while few of them practice yoga or engage in outdoor sports or games (Table 1).

Family history of diabetes was present in 68 (22%) participants. Co-morbidity presented in 59% participants (123), most commonly hypertension (89%) followed by cardio vascular disease (8%), neuropathy (5%), nephropathy (4%) and COPD (4%). The mean duration of diabetes was 5.69 ± 3.44 years, with 59.3% having diabetes for 1-5 years followed by 28.1% had since 6 to 10 years and 39 (12.6%) participants had diabetes since last more than 10 years. Complications were present in 18% of participants, with cardiovascular disease being the most common (47.3%), followed by retinopathy (38.5%),

neuropathy (36.8%), nephropathy (19.3%) and foot damage (3.5%).

Part-2: QOL assessment with its association with various factors

Out of 310 participants, 47% had fair, 43% had good, and 10% had poor quality of life (QOL) (Figure 1). QOL scores ranged from 18.14 to 98.95, with a mean of 71.37 ± 18.14 . The mean QOL score for males was 72.64 ± 17.43 , while for females it was 70.09 ± 18.73 .

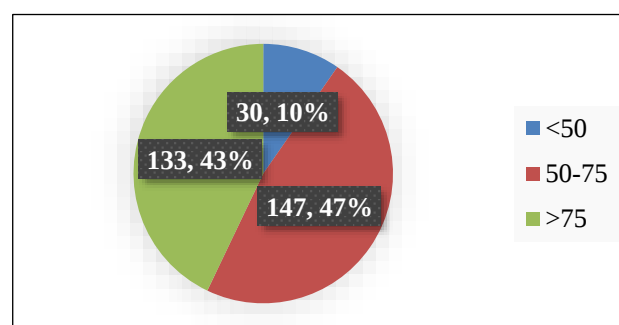


Figure 1: Distribution of participants according to QOL Score.

The most affected domain was general health, more so in females, followed by social functioning, energy/fatigue, role limitation due to physical health, pain, and physical functioning. The least affected domain was role limitation due to emotional problems, also more affected in females. Significant differences between males and females were seen in role limitation due to emotional problems, social functioning, and general health, while other domains showed no significant gender differences (Table 2).

Table 2: Total and gender wise scores of all domains of SF-36.

Domain	Male	Female	Domain score
Physical functioning	73.46±23.82	71.26±26.69	72.36±25.32
Role limitation (physical health)	72.62±20.31	70.83±22.21	71.72±21.29
Role limitation (emotional problem)	78.27±21.64	72.55±22.91	75.41±22.46
Energy/fatigue	72.21±17.84	71.25±17.31	71.72±17.58
Emotional well being	74.36±15.71	72.96±17.14	73.66±16.45
Social functioning	70.83±20.94	66.91±24.15	68.87±22.69
Pain	72.91±19.29	71.61±22.06	72.26±20.73
General health	66.52±14.97	63.33±19.46	64.91±17.43
Total QOL	72.64±17.43	70.09±18.73	71.37±18.14

Table 3: Association of QOL with general demographic variables.

Demographic variable	Sub categories	QOL score (n=310)			Total	χ^2 value	p value	Result
		Poor (<50) N=30	Fair (50-75) N=147	Good (>75) N=133				
Age group	30-50 y	1 (1)	25 (26)	70 (73)	96	167.46	<0.0001	Sig.
	51-70 y	10 (5)	115 (62)	62 (33)	187			
	>70 y	19 (70)	7 (26)	1 (4)	27			
Gender	Male	8 (5)	77 (48)	75 (47)	160	8.72	0.0127	Sig.
	Female	22 (15)	70 (47)	58 (39)	150			
Religion	Hindu	22 (9)	109 (48)	98 (43)	229	0.0123	0.9936	Non-sig.
	Muslim	8 (10)	38 (47)	35 (43)	81			
Education*	Lower	19 (33)	28 (48)	11 (19)	58	52.12	<0.0001	Sig.
	Medium	10 (5)	97 (49)	89 (46)	196			
	Higher	1 (2)	22 (39)	33 (59)	56			
Occupation**	Category 1	24 (11)	109 (51)	82 (38)	215	7.23	0.1239	Non-sig.
	Category 2	5 (6)	33 (41)	42 (53)	80			
	Category 3	1 (7)	5 (33)	9 (60)	15			
Type of family	Nuclear	1 (2)	35 (56)	27 (43)	63	15.14	0.0044	Sig.
	Joint	13 (9)	54 (39)	70 (51)	137			
	3 gen.	16 (15)	58 (53)	36 (33)	110			
Marital Status	Married	26 (10)	130 (47)	118 (43)	274	0.1014	0.9505	Non-sig.
	Single***	4 (11)	17 (47)	15 (42)	36			
Diet type	Vegetarian	19 (10)	92 (48)	83 (43)	193	0.023	0.9881	Non-sig.
	Mix diet	11 (10)	55 (47)	50 (43)	117			
Over crowding	Yes	28 (10)	133 (49)	110 (41)	271	4.88	0.8678	Non-sig.
	No	2 (5)	14 (36)	23 (59)	39			
Socio-economic status	II	7 (5)	73 (47)	75 (48)	155	11.44	0.021	Sig.
	III	22 (15)	68 (47)	55 (38)	145			
	IV	1 (10)	6 (60)	3 (30)	10			

*Lower education included illiterate/just literate, medium included primary/secondary school and higher included higher secondary/graduation/post-graduation. **category 1 occupation included unemployed/unskilled worker, category 2 included semiskilled/skilled/clerical/shop owner/farmer and category 3 occupation included semi-professional/professional ***single included widow/widower. Numbers in bracket represented the percentage. Result significant at $p < 0.05$. Sig. = significant

QOL worsens with age: 73% of those aged 30-50 had good QOL, while only 4% of those over 70 did. Additionally, 70% of participants over 70 had poor QOL. The age-QOL difference was significant ($p < 0.00001$). Of the 160 males, 5% had poor, 48% had moderate, and 47% had good QOL, while of the 150 females, 15% had poor, 47% had moderate, and 39% had good QOL. This indicates that females had lower QOL than males, with a

statistically significant difference ($p = 0.0127$). Religion showed no significant association with QOL, with both groups having similar distributions (Table 3).

QOL scores were significantly higher in participants with higher education ($p < 0.00001$). Among those with higher education, 59% had good QOL, compared to 19% in illiterate or minimally educated participants. Employment

status affected QOL, with 11% of unemployed/unskilled workers reporting poor QOL, compared to 6-7% in skilled and professional workers. However, this difference was not statistically significant ($p=0.1239$) (Table 3).

Participants from nuclear families had better QOL ($p = 0.0044$), with only 2% having poor QOL, compared to 9% in joint families and 15% in three-generation families. Marital status showed no significant association with QOL ($p=0.9505$). Diet type (vegetarian vs. mixed) had no significant effect on QOL ($p=0.9881$). Participants living with overcrowding had lower QOL, but this difference was not significant ($p=0.8678$). Higher socio-economic status was associated with better QOL, with a significant difference ($p=0.021$) (Table 3).

Lifestyle significantly affected QOL ($p=0.0025$), with sedentary workers reporting lower QOL compared to moderate and heavy workers. Among sedentary participants, 13% had poor and 37% had good QOL, while 8% and 83% of heavy workers, and 5% and 47% of moderate workers, had poor and good QOL, respectively. Addiction showed no significant association with QOL ($p = 0.53$), though it slightly affected overall health. Among 96 addicted participants, 11% had poor, 50% fair, and 39% good QOL, compared to 9%, 46%, and 45% in non-addicted participants. Regular physical activity (≥ 30 minutes, thrice a week) was associated with higher QOL ($p=0.0016$); 54% of active participants had good QOL, compared to 36% in inactive participants. (Table 4).

Table 4: Association of QOL with behaviour/habits.

Behaviour habits	Sub categories	QOL score (n=310)			Total	χ^2 value	P value
		Poor (<50) n=30	Fair (50-75) n=147	Good (>75) n=133			
Life style	Sedentary	23(13)	85 (50)	63 (37)	171	16.41	0.0025 (significant)
	Moderate	6 (5)	61 (48)	60 (47)	127		
	Heavy	1 (8)	1 (8)	10 (83)	12		
Addiction	Yes	11 (11)	48 (50)	37 (39)	96	1.27	0.53 (non sig.)
	No	19 (9)	99 (46)	96 (45)	214		
Physical exercise	Yes	2 (2)	51 (44)	62 (54)	115	17.43	0.0016 (sig.)
	No	28 (15)	96 (49)	71 (36)	195		

Numbers in bracket represented the percentage. Result significant at $p<0.05$

Table 5: Association of QOL with medical history.

Medical History	Sub categories	QOL score (n=310)			Total	χ^2 value	P value	Result
		Poor (<50) n=30	Fair (50-75) n=147	Good (>75) n=133				
Duration of diabetes	1-5 y	7 (4)	74 (40)	103 (56)	184	100.24	<0.0001	Significant
	6-10 y	4 (5)	54 (62)	29 (33)	87			
	>10 y	19 (49)	19 (49)	1 (2)	39			
Co-morbidity	Yes	12 (9)	71 (58)	40 (33)	123	9.69	0.0078	Significant
	No	18 (9)	76 (41)	93 (50)	187			
Complication	Yes	15 (26)	39 (68)	3 (5)	57	49.53	<0.0001	Significant
	No	15 (6)	108 (43)	130 (51)	253			

Longer duration of diabetes correlated significantly with lower QOL ($p<0.00001$). Among 184 participants with diabetes for 1-5 years, 56% had good QOL, while only 2% of those with diabetes for more than 10 years had good QOL, and 49% had poor QOL. Participants with comorbidities had lower QOL scores ($p=0.0078$); 33% of these had good QOL compared to 50% in those without comorbidities. QOL was also significantly higher in participants without diabetes-related complications ($p<0.00001$), with 51% of those without complications reporting good QOL, compared to only 5% of those with complications (Table 5).

DISCUSSION

The current study involved interviews with 310 patients diagnosed with Diabetes, comprising 160 males and 150 females. Eighty percent of the respondents were in the age-group of 40–70 years, which is consistent with the pattern of diabetes observed in developing countries.¹⁶ Mean age in present study was 55.46 ± 9.855 years which is almost closer to 54.45 ± 9.7 which was mean age in study by Kumar et al.¹⁷

In our study, we found that education level was comparatively higher among male. Similarly, Gupta et al also found this different significant ($\chi^2 = 68$; $p < 0.001$).¹⁸

The most frequent co-morbidity in this study was hypertension (89%) followed by cardio vascular disease (8%), neuropathy (5%), nephropathy (4%) and COPD (4%). Similarly, Spasić et al found most frequent comorbidities were hypertension (75.96%), chronic cardiovascular diseases (CVS) (32.48%), chronic renal failure (23.3%) and polyneuropathy (23%).¹⁹

The mean duration of diabetes among respondents in the present study was 5.69 ± 3.44 years, which is similar to study done in South India by Kumar et al which show 5.78 ± 4.9 years mean duration.¹⁷ In comparison, Okanovic⁽²⁰⁾ (Croatia) and Subratty (Mauritius) have reported a mean duration of diabetes in their study subjects of 10.2 ± 6.2 years and 9.3 ± 7.7 years, respectively.²¹

In a study by Jain et al carried out in Maharashtra, they observed the significant difference between male and female in physical health domain and no difference in psychosocial health domain.²² This finding is consistent with the finding of our study. A study in UK by Woodcock et al also reported better scores for males in all domains.²³

The difference between QOL score and gender was found statistically significant ($p = 0.0127$). Gautam et al and Al-Abadla et al also found that gender was significantly associated with QOL score.^{24,25} In these both studies, they found that males had comparatively higher QOL than females. Similar result was seen in this study. Angelos et al study in Greece also showed statistically significant lower QOL scores in females, similar to our study.²⁶ In a study carried out by Rajput et al in Rohtak also, advancement age was found significantly associated with lower QOL score.²⁷ corresponding with our study, as age advances QOL worsens.

This study discovered a substantial correlation between patients' level of education and their quality of life ($p < 0.0001$). Similar result was found in study Thapa et al where education is significantly associated with QOL score ($p = 0.021$).⁹

In relation to employment status, QOL score was lower in unemployed and unskilled worker compared to skilled worker and professionals. This difference was statistically significant in a study carried out by Al-Abadla et al, which is in contrast to this study ($p = 0.12$).²⁵

In the current study, there was a substantial correlation between the type of family and the QOL score, with participants from nuclear families exhibiting a much higher QOL than those from joint families. Similar findings were found by Anumol Mathew et al, who found that people who were part of a nuclear family had a considerably higher quality of life.²⁸

Participants' marital status did not significantly impact their QOL levels in this study ($p = 0.9505$). On contrast to this, John et al.⁽²⁹⁾ found the difference between marital status and QOL score statistically significant ($p = 0.0007$). Al-matrouk et al stated that study showed poor social relationship among divorced patients when compared with married ones.³⁰ This can be explained by the absence of social support and inclusion provided by the spouse hence lacking close personal relationships; thus, the loss of the spouse can deteriorate the QOL of diabetic patients.

QOL scores were higher in participants from higher socio-economic classes and lower in those from lower socio-economic classes, with a statistically significant difference ($p = 0.021$). Similarly, a study by Mathew George et al in Kerala found a significant association between socio-economic status and QOL scores.³¹

Participants who were doing regular physical activity at least thrice a week and minimum 30 minutes a day had higher QOL and Low level of physical activity was found to be associated with poor QOL scores. This is in consistent with other studies, in Glasgow et al study low level of physical activity was associated with poor QOL scores and also a randomized controlled trial by Myers et al also reported good QOL scores (physical component subscale and the general health subscale) in type 2 diabetics who were given exercise training compare to control group.^{32,33} Ajmera et al also found the significant association of physical activity with QOL.³⁴

The duration of diabetes was inversely correlated with QOL, indicating that the longer a patient suffered from diabetes, the QOL decreased. Gebremedhin et al also found that duration of diabetes was associated significantly with all domains of QOL.³⁵

Overall, the SF-36 score was significantly lower among respondents with complications as compared to respondents with no complication. Woodcock et al also observed better scores in all domains in those without complications.²³

This study has few limitations. Some information generated during study was recall based, can lead to recall bias. However, it was tried to reduce recall bias as much as possible during the interview. A comparison group of non-diabetic subjects was not included in study.

CONCLUSION

The study included 160 male and 150 female diabetic patients. The mean QOL score was 71.37 ± 18.14 , ranging from 18.14 to 98.95, with males having a mean of 72.64 ± 17.43 and females 70.09 ± 18.73 . Among the total participants, 9.7% had poor QOL, 47.4% had fair QOL, and 42.9% had good QOL. Significantly associated variables with QOL included age, gender, education, type of family, socioeconomic status, lifestyle, physical

activity, comorbidity, duration and complication of diabetes. QOL in diabetics had not significant association with religion, occupation, marital status, type of diet, overcrowding and addiction.

Recommendations

To improve QOL in diabetes, patients should be educated on glucose control and treatment compliance. Improving education status and avoiding substance abuse are key. Regular physical activity (30 minutes daily) and yoga enhance QOL, as does thorough assessment and treatment of comorbidities. Preventing diabetes related complications through regular screening for retinopathy, nephropathy, CVD, neuropathy, and foot issues is essential.

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REFERENCES

- World Health Organization. Noncommunicable diseases. Available at: <https://www.who.int/health-topics/noncommunicable-diseases>. Accessed 22 December 2022.
- National Centre for Disease Informatics and Research. Chapter_1_1.pdf. Available at: https://www.ncdirindia.org/nnms/resources/Chapter_1_1.pdf. Accessed 21 December 2022.
- International Diabetes Federation. IDF_DA_8e-EN-final.pdf. Available at: https://diabetesatlas.org/upload/resources/previous/files/8/IDF_DA_8e-EN-final.pdf. Accessed 24 January 2023.
- International Diabetes Federation. IDF Atlas 10th Edition 2021.pdf. Available at: https://diabetesatlas.org/idfawp/resource-files/2021/07/IDF_Atlas_10th_Edition_2021.pdf. Accessed 21 December 2022.
- National Centre for Disease Informatics and Research. Factsheet.pdf. Available at: <https://www.ncdirindia.org/nnms/resources/factsheet.pdf>. Accessed 21 December 2022.
- International Management Institute. Gujarat NFHS-5 Factsheet.pdf. Available at: <https://www.im4change.org/docs/Gujarat%20NFHS-5%20Factsheet.pdf>. Accessed 21 December 2022.
- World Health Organization. Definition and diagnosis of diabetes mellitus and intermediate hyperglycaemia: report of a WHO/IDF consultation, 2006. Available at: <https://www.who.int/publications/i/item/definition-and-diagnosis-of-diabetes-mellitus-and-intermediate-hyperglycaemia>. Accessed 21 December 2022.
- World Health Organization. WHOQOL - Measuring Quality of Life. Available at: <https://www.who.int/tools/whoqol>. Accessed 21 December 2022.
- Thapa S, Pyakurel P, Baral DD, Jha N. Health-related quality of life among people living with type 2 diabetes: a community based cross-sectional study in rural Nepal. BMC Public Health. 2019 Dec;19(1):1171.
- India Census. Ahmedabad City Population 2023 - Sex Ratio, Population Density, Literacy. Available at: <https://www.indiacensus.net/city/ahmedabad>. Accessed 11 January 2023.
- World Health Organization. Steps-manual.pdf. Available at: https://cdn.who.int/media/docs/default-source/ncds/ncd-surveillance/steps/steps-manual.pdf?sfvrsn=c281673d_7. Accessed 21 December 2022.
- Patel PM, Makadia K. Golden notes for preventive and social medicine. S.l.: JP MEDICAL LTD; 2020.
- National Institute of Nutrition. DietaryGuidelinesforNINwebsite.pdf. Available at: <https://www.nin.res.in/downloads/DietaryGuidelinesforNINwebsite.pdf>. Accessed 18 January 2023.
- Park K. Park's textbook of preventive and social medicine. 24th ed. Jabalpur: M/s Banarsidas Bhanot Publishers; 2017:976.
- Ware JE Jr, CDS. The MOS 36-Item Short-Form Health Survey (SF-36) I. Conceptual framework and item selection. Lippincott Williams Wilkins. 30(6):473-83.
- Petersen PE. World Health Organization: Organisation Mondiale de la Sante. Comm Dent Oral Epid. 2003;31(6):471.
- A S, Koppad R, Sv C, Revathy R. Quality of life of type 2 diabetes patients in a tertiary care hospital in southern part of India, Shimoga, Karnataka: a cross-sectional study. Int J Community Med Public Health. 2016;1723-8.
- Gupta J, Kapoor D, Sood V. Quality of life and its determinants in patients with diabetes mellitus from two health institutions of sub-Himalayan region of India. Indian J Endocrinol Metab. 2021;25(3):211.
- Spasić A, Radovanović RV, Đorđević AC, Stefanović N, Cvetković T. Quality of life in type 2 diabetic patients. Acta Fac Med Naissensis. 2014;31(3):193200.
- Pibernik-Okanović M. Psychometric properties of the World Health Organization quality of life questionnaire (WHOQOL – 100) in diabetic patients in Croatia. Diabetes Res Clin Pract. 2001;51:133-43.
- Subratty A, Anathallee Y, Jowaheer V, Wah MLC. Quality of life of people with type 2 diabetes in Mauritius. Diabetes Prim Care. 2003;5(4).

22. Jain V, Shivkumar S, Gupta O. Health-related quality of life (Hr-Qol) in patients with type 2 diabetes mellitus. *North Am J Med Sci*. 2014;6(2):96.
23. Woodcock AJ, Julious SA, Kinmonth AL, Campbell MJ. Problems with the performance of the SF-36 among people with type 2 diabetes in general practice. *Qual Life Res*. 2001;10:661-70.
24. Gautam Y, Sharma A, Agarwal A, Bhatnagar M, Trehan R. A cross-sectional study of QOL of diabetic patients at tertiary care hospitals in Delhi. *Indian J Commu Med*. 2009;34(4):346.
25. Al-Abadla Z, Elgzyri T, Moussa M. The effect of diabetes on health-related quality of life in Emirati patients. *Dubai Diabetes Endocrinol J*. 2022;28(1):35-44.
26. Papadopoulos AA, Kontodimopoulos N, Frydas A, et al. Predictors of health-related quality of life in type II diabetic patients in Greece. *BMC Public Health*. 2007;7:186.
27. Rajput M, Arivarasan Y, Khongsit A, Rajput R. Quality of life among diabetics: A cross-sectional study in a tertiary care center of Rohtak, Haryana. *Indian J Commu Med*. 2020;45(3):283.
28. Mathew A, Thomas K. Quality of life among type-II diabetes mellitus patients in South India: A descriptive study. *Am Int J Res Humanit Arts Soc Sci*. 2016;7(2):197-200.
29. John R, Pise S, Chaudhari L, Deshpande P. Evaluation of quality of life in type 2 diabetes mellitus patients using quality of life instrument for Indian diabetic patients: A cross-sectional study. *J Life Health*. 2019;10(2):81.
30. Al-Matrouk J, Al-Sharbati M. Quality of life of adult patients with type 2 diabetes mellitus in Kuwait: A cross-sectional study. *Med Princ Pract*. 2022;31(3):238-45.
31. George M, Joseph L. A study on quality-of-life assessment among patients with type 2 diabetes mellitus in a tertiary care hospital in Southern Kerala. *Int J Pharm Pharm Res*. 2016;6(4):601-39.
32. Glasgow RE, Ruggiero L, Eakin EG, Dryfoos J, Chobanian L. Quality of life and associated characteristics in a large national sample of adults with diabetes. *Diabetes Care*. 1997;20:562-7.
33. Myers VH. Exercise training and quality of life in individuals with type 2 diabetes. *Diabetes Care*. 2013;36(7):1884-90.
34. Ajmera P, Jain V. Modeling the factors affecting the quality of life in diabetic patients in India using total interpretive structural modeling. *Benchmarking Int J*. 2019;26(3):951-70.
35. Gebremedhin T, Workicho A, Angaw DA. Health-related quality of life and its associated factors among adult patients with type II diabetes attending Mizan Tepi University Teaching Hospital, Southwest Ethiopia. *BMJ Open Diabetes Res Care*. 2019;7(1):e000577.

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